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Level Control using a Genetic Algorithms Based PID Control Design

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ABSTRACT

The PID controller is still one of the control strategies which are widely applied for industrial process control because of their simplicity and robustness. However, the increasing complexity of the modern control systems has emphasized the idea of applying more efficient computing approaches such as neural networks and genetic algorithms in order to solve complicated design problems that may not be handled by conventional PID controllers. An extension to previous work [1], in this paper the PID based Genetic Algorithms controller is applied to interacting double-tank system [2]. In addition this work investigates the effect of different Performance indices (MSE, ITAE, ISE and IAE) that are used for optimizing the setting of PID controller gain values. Also this article compares the PID based Genetic Algorithms controller with the traditional Ziegler Nichols tuning method to demonstrate the effectiveness of these performance indices in the closed-loop responses in both time domain and frequency domain.

Keywords: PID controller, MES, ITAE, ISE, IAE, Genetic Algorithms, interacting double-tank system.